

We claim:

1. An electronic circuit, comprising:

a first electromechanical actuator coil coupled to a cylinder valve of an internal combustion engine,

5 a second electromechanical actuator coil, where a first end of said second electromechanical actuator coil is coupled to a common reference with a first end of said first electromechanical actuator coil;

10 a first energy storage device, where a first end of said first energy storage device is coupled to said common reference; and

a second energy storage device, where a first end of said second energy storage device is coupled to said common reference.

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2. The electronic circuit of claim 1 wherein said first energy storage device is a first capacitor.

20 3. The electronic circuit of claim 1 wherein said second energy storage device is a second capacitor.

4. The electronic circuit of claim 1 further comprising: a voltage source, with a first end of said source coupled to a second end of said first energy storage device.

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5. The electronic circuit of claim 4 wherein a second end of said source is coupled to a second end of said second energy storage device.

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6. The electronic circuit of claim 1 further comprising:  
a first one way current device, with a first end of said  
one way current device coupled to a second end of said first  
electromechanical actuator coil.

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7. The electronic circuit of claim 6 further comprising:  
a second one way current device, with a first end of said  
one way current device coupled to a second end of said second  
electromechanical actuator coil.

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8. The electronic circuit of claim 1 further comprising:  
a first switch for actuating said first electromechanical  
actuator coil; and  
a second switch for actuating said second electromechanical  
15 actuator coil.

9. A system, comprising:  
a dual-coil half bridge converter adapted to be coupled to  
a single or multiple coil actuator of a cylinder valve, the  
20 cylinder valve in an internal combustion engine, the converter  
having a first and second capacitor and a voltage source, the  
converter actuated via switches to individually energize coils  
in said dual coil actuator.

25 10. The system of claim 9 wherein said dual-coil half  
bridge converter maintains a charge balance on said first and  
second capacitor.

11. The system of claim 9 wherein said converter is  
30 adapted to be coupled to a plurality of engine cylinder valves.

12. The system of claim 11 wherein said dual coil half bridge converter maintains a charge balance on said first and second capacitor even when at least one cylinder of the engine is deactivated while at least one other cylinder carries out combustion.

13. The system of claim 9 wherein said capacitors form a dual voltage source.

14. The system of claim 9 wherein said dual coil half bridge converter is adapted to be coupled to at least two dual coil actuators of two cylinder valves, wherein the converter is configured to balance voltage of said first and second capacitor.

15. A dual coil half bridge power converter system, comprising:  
a power source;  
a single or multiple coil actuator of a cylinder valve, the cylinder valve in an internal combustion engine,  
only one actuating switch for actuating each coil in said actuator; and  
an energy storage device for storing energy during deactivation of at least one coil.

16. The system of claim 15 further comprising a unidirectional current device for allowing freewheeling current during deactivation of at least one coil.

17. The system of claim 16 wherein said storage device includes two capacitors in a split voltage power supply topology.

18. The system of claim 16 wherein said energy storage device includes two capacitors in a boosted power supply topology.

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19. The system of claim 15 further comprising a plurality of dual coil actuators of cylinder valves of an engine, and only one actuating switch coupled to each coil of said plurality of coils.

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20. A system comprising:

a power supply with a positive and negative terminal;

a first coil coupled to a cylinder valve actuator of an engine, said first coil having a first end and a second end;

15 a first switch coupled between one end of said first coil and said positive terminal of said power supply;

a first capacitor coupled between said positive terminal of said power supply and said second end of said first coil;

20 a first diode coupled between said second end of said first coil and said negative terminal;

a second coil, said second coil having a first end and a second end, said first end of said second coil coupled to said second end of said first coil;

25 a second capacitor coupled between said first end of said second actuator and said negative terminal;

a second switch coupled between said second end of said second capacitor and said negative terminal; and

a second diode coupled between said second end of said second coil and said positive terminal.

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21. The system of claim 20 where said negative terminal of said power supply is coupled to a ground.

22. The system of claim 20 where said switches control  
5 actuation of at least one cylinder valve of an internal combustion engine.

23. The system of claim 20 wherein said second coil is coupled to said cylinder valve actuator.

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24. The system of claim 20 wherein said second actuator is coupled to another cylinder valve actuator of said engine.

25. The system of claim 20 further comprising third and  
15 fourth actuators, wherein said system is configured to balance voltage across said first, second, third, and fourth actuators.

26. The system of claim 20 where said second end of said first coil is coupled to ground.

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